The Role of Plant Agricultural Practices on Development of Antimicrobial Resistant Fungi Affecting Human Health

Scenario and Discussion Questions

HYPOTHETICAL SCENARIO

A new variant of COVID-19 with considerable immune escape has led to an uptick of people with serious illness. In at least two states in the US Northeast, a few patients recovering from COVID-19, who were otherwise healthy and immunocompetent, were later diagnosed with invasive aspergillosis and started on first-line antifungal therapy (i.e., voriconazole). The patients not responding to azole antifungal therapy were sick enough that they were transferred to the same large, regional medical center and received a new drug that recently received approval for clinical use – a dihydroorotate dehydrogenase (DHODH) inhibitor. Surprisingly, the infections still fail to respond to treatment despite the short amount of time that the new drug has been in use. Soon after, the clinicians present these cases at a national conference and find that colleagues from a few regional medical centers around the US encountered similar cases.

Altogether, the affected patients are predominantly farm workers and landscapers. An astute clinician is aware that there is a new fungicide used in agricultural and landscaping settings that have a similar mechanism of action.

In this **hypothetical** scenario, this fungicide is being used on essential crops and in growing conditions where there are few other fungicide choices. There are indications that the fungicide is being used responsibly (e.g., monitoring for target pathogen resistance within agricultural systems, rotating with other fungicides in field use as needed). We also acknowledge that development or spread of resistance to antimicrobial entities is inevitable with increased (and necessary) usage.

POTENTIAL DISCUSSION QUESTIONS

- Given the above, can we do anything differently to minimize the harm to human health in this potential scenario (e.g., having common and collaborative surveillance approaches between agricultural and medical uses to mitigate or respond to emergence of resistance in both settings)? Who are key stakeholders and how can they work together toward a common agenda for harm reduction?
- What information is needed for immediate response to this emerging issue? For longer term management?
- What are potential policy options that can help governments prepare for, respond to, and prevent a similar scenario in the future? What would actionable data to inform these policy options look like? Are there resource(s) that does not yet exist that would be helpful in this scenario?